Caltrans Uses Technology to Improve Your Drive

The lines pictured here on the pavement are sensors that count vehicles and measure their speed. The data Caltrans collects from devices on the highways is sent to transportation management centers (pictured below) to help Caltrans and California Highway Patrol employees manage traffic and respond to incidents.

Caltrans doesn't just build infrastructure. Smart expansion of the system starts with good data that accurately relays what is happening on California's transportation system and help determine the most effective investments to get travelers from point A to point B safer and more efficiently.

In the future, there will be smarter cars and an intelligent roadway system that will help meet transportation challenges—from safety improvements in automobiles, to traveler information advancements, to the next generation of system management and congestion pricing.

Throughout the state, Caltrans operates 12 *transportation management centers* to monitor highway and weather conditions within a region. These centers are a hub for intelligent transportation system (ITS) technology devices.

In the last decade, Caltrans has invested in more than 50,000 of these ITS devices that measure and report vehicle speed, weight, and traffic volume on California highways. Caltrans transportation management centers use the information these

devices send each day to manage traffic, provide information to travelers and partners, and to plan long-term improvements.

To better manage traffic, Caltrans uses technology and innovation to collect information about how motorists are using the highways. Those data-collection devices include electronic message signs, ramp meters, and closed-circuit cameras.

Caltrans' inventory of all field devices has more than doubled in the last decade, while staffing has not.

Caltrans investments for detection include magnetometers and radar sensors. Another tool that has proven useful in managing congestion is ramp meters, which stagger cars entering freeways to prevent merge chokepoints. Caltrans now has 60 percent of all ramp meters in the United States and plans for more.

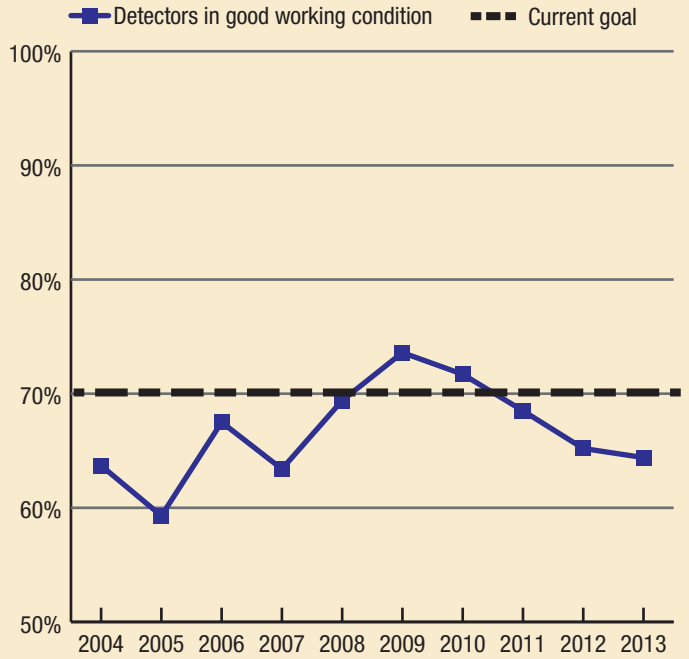
In addition to posting drive times on electronic message signs on California freeways, Caltrans has developed an online service that provides real-time traffic and travel information that allows motorists to make better decisions about how to reach their destination more rapidly. It is called *QuickMap*, and it shows the public current traffic speeds, incidents, lane closures, closed-circuit TV camera images from the highways, and snow chain requirements.

Caltrans also installs and monitors its 39,000 vehicle detectors, imbedded in urban freeways, which collect traffic vehicle volume and speed data and send it to the traffic management centers every 30 seconds. This allows us to monitor and evaluate the highway system in real time. The detectors also help with long-term planning and analysis, and traffic management. Maintaining vehicle detectors in good working condition is critical to ensuring the state's transportation system data collected can be used in making operational and road improvement decisions.

Caltrans' target is to maintain at least 70 percent of the detectors in good working condition with a longer-term goal of achieving 90 percent by reducing construction-related outages and developing funding strategies to maintain and replace ITS elements, over the next 10 years.

Caltrans is currently falling short of the 70 percent target for several reasons. Many detectors are reaching the end of their lives. Some are temporarily disabled because of construction, and others are disabled because of the theft of field equipment and copper wire, which has become a larger problem in recent years. Since the inventory of ITS devices has more than doubled in the last 10 years, but the staffing to maintain them has not, keeping up with the maintenance demand is increasingly difficult. To prevent future copper theft, we are investigating the use of aluminum wire and reducing the number of places someone can gain access to the wires. Caltrans is developing additional tools to help identify and report failed detectors.

Statewide Detector Health



Data Source: Division of Traffic Operations
Note: 2013 data is for the year through December 17, 2013
Note: Data is by calendar year.

Caltrans measures how well its traffic detectors are working to ensure we are collecting accurate data. Caltrans has the same staffing levels and over 5,000 more detectors now than it had in 2007, yet the percentage of operational detectors has remained the same. We have worked toward increasing detector health, as shown in 2008 and 2009, but copper wire theft, aging detectors and temporarily disabled detectors due to construction have dropped the percentage of functioning detectors.

This magnetometer is one of the various types of sensors Caltrans uses to collect traffic volumes and speed.